TEXTILE *Technology* DIGEST

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TEXTILE TECHNOLOGY DIGEST

VOLUME 10 DECEMBER, 1953 NUMBER 12

Abstracts

[1509]

FIBERS A

Heat of wetting of fibres

N. F. H. Bright, T. Carson and G. M. Duff (Imperial Chemical Industries, Ltd.). *J. Textile Inst. 44:* T587-T595 (December, 1953).

Measurements have been made of the total heats of wetting of wool, Ardil, natural and regenerated silk, drawn and undrawn nylon, drawn and undrawn Terylene, drawn continuous filament Orlon, and also of the partial heats of wetting of wool and Ardil. 13 references.

Natural Fibers A 1

Approximate porosity of bast filament

K. R. Sen. *Indian Textile J. 64:* 108-109, 104 (November, 1953).

Measurements were made on two species of jute and on ramie. The methods used are given. 8 references.

CHANGES IN TWO FIBER PROPERTIES OF COTTON OVER A TEN YEAR PERIOD. J. E. Hite. Beltsville, Md., U. S. Bur. Plant Ind., Soils and Agri. Eng., March, 1953. 11p. Free.

Varieties grown during 1939 to 1941 were compared with those grown from 1949 to 1951. Average fiber length and fiber strength determinations are shown for the varieties listed. According to these data, the composite 10-year change in fiber properties of the U. S. crop equals 6% gain in fiber length, plus 6.7% gain in strength.

Color in cotton

Simon A. Simon and Carlyle Harmon (Chicopee Mfg. Corp., Chicopee Falls, Mass.). *Textile Research J. 24:* 12-16 (January, 1954).

The color of cotton is defined, and the sources of color in cotton are classified. A review of past work on the nature of the intrinsic color of

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cotton is given, and the chlorogenic acid theory of the source of unbleachable color is criticized. It is concluded that the intrinsic colorants of cotton should not survive bleaching. The literature reporting on the sources of extrinsic colorants is also reviewed. It is shown that the color remaining in cotton after bleaching is of this nature. It is finally demonstrated that the color persisting after bleaching is due to fungi which flourish under the correct weather conditions. The undesirable color is shown to be chromatic and is the result of the fungi presence itself. Spectrophotometric data supporting the analysis are given. 12 references.

Gin-damaged cotton

Textile Ind. 118: 145-161 (February, 1954).

Gin-damaged cotton and lowering of grades cause trouble for the spinners and cost them money. The author traces the history and background leading to the present situation, and he suggests that mills pay for cotton on the basis of what it is (rather than on the basis of what it appears to be).

MECHANICAL PROPERTIES OF DECRYSTALLIZED COTTON. George Susich. Office of the Quartermaster General. Research and Development Division. 1953. 20p. Available from Office of Technical Services, Washington 25, D. C. $.75. PB 111 214. Textile series report no. 79.

The alteration of a cotton yarn by the amine treatment developed in the Southern Regional Research Laboratory was investigated. The crystallinity of native cotton is markedly reduced after swelling in primary lower amines without affecting the structure, orientation or degree of polymerization of the cellulose I. Decrystallization increases the extensibility and the work necessary to rupture without lowering the tenacity. Enhanced extensibility is attained mainly by increased permanent set. Nevertheless the

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elastic recovery is higher after decrystallization if compared at identical strain levels. The elastic recovery of decrystallized cotton increases when wet. The excellent knot and wet behavior of native cotton fibers remain unaltered, but resistance to abrasion decreases after the amine treatment.

The physical properties of felt. Part 1. Felt structure, extension and recovery

A. Baines (Brit. Hat & Allied Feltmakers' Research Assoc.). *J. Textile Inst. 44:* T645-T656 (December, 1953).

From an initial concept of a structural unit, the mechanisms of fiber behavior during felt extension and recovery are developed. The experimental determination of this relationship for both wool fibers and wool felt is described and data thus obtained are shown to have the form predicted by the structural unit theory. 8 references.

Preparation of microbiologically resistant wool by means of chemical modification. Part 2. Paper chromatographic investigation of the samples.

Helmut Zahn (Univ. of Heidelberg, Germany). *Textile Research J. 24:* 26-31 (January, 1954).

The chemically modified wool samples described in Part 1 of this series were investigated by paper chromatography. Deviations in behavior from the hydrolysis products of untreated wool were observed in the hydrolysis products of samples modified in the following manner: treatment with epichorohydrin, acetylation, dinitrophenylation, nitration, formalization, treatment with Kaurit 140, butanediol-bis-chloromethyl ether, acetone and bicarbonate, bis-chloromethyldimethylbenzene, reduction and methylation, KCN and NaOH treatment. In some cases the paper chromatographic method of investigation offers the sole means of analysis of chemically modified wool. Its significance for the chemistry of wool research has been demonstrated by the formation of lanthionine in wool treated with acetone and bicarbonate.

Reaction between wool and nickelammonium hydroxide. Part 2. The supercontraction of wool fibres in solutions of nickelammonium hydroxide

J. W. Bell and C. S. Whewell. *J. Soc. Dyers Colourists 69:* 491-496 (December, 1953).

When wool is immersed in solutions of nickelammonium hydroxide, nickel is adsorbed and the fibers contract in length. It is shown that the adsorption of only about 7% of nickel can induce a contraction of 40%; on removing the nickel

by immersing the fiber in dilute acid it partly regains its original length. In general, chemically modified fibers do not recover their original length, the exception being those in which the disulfide bond is replaced by the lanthionine linkage. The improved reversibility of these fibers suggests that the disulfide cross-links play an important part in the recovery of fibers whose molecular structure has been distorted through combination with nickel.

Relation between external shape and internal structure of wool fibers

E. H. Mercer (Textile Research Inst., Princeton, N. J.). *Textile Research J. 24:* 39-43 (January, 1954).

Relations between the twisted bilateral structure of the cortex of the wool fiber and its external shape are pointed out. Both the crimped form and the elliptical cross-sectional shape follow the twisted internal structure. Changes in crimp shape are interpreted as a consequence of the unequal expansion of the ortho- and the paracortex. The geometrical relations of the crimp and ortho- and paracortex are traced back to events occurring during keratinization of the fiber. 9 references.

Relative responsiveness of certain properties of cotton fiber to microbial action

P. B. Marsh, K. Bollenbacher, M. L. Butler, and G. V. Merola (U. S. Bur. Plant Industry, Soils, Agri. Eng., Beltsville, Md.). *Textile Research J. 24:* 31-38 (January, 1954).

Experiments were carried out to determine the relative responsiveness of certain fiber properties to the growth of fungi. Raw cotton fiber and unbleached cotton fabric were innoculated and incubated for varying periods up to 28 days in a water-vapor-saturated atmosphere with each of three common fungi under pure-culture conditions, and various properties of the fiber and fabric were measured subsequently. 15 references.

Structural details of the surface layers of wool

Gosta Lagermalm (Swedish Institute for Textile Research). *Textile Research J. 24:* 17-25 (January, 1954).

Electron microscopical studies have been made on the surface layers of wool, separated from the rest of the fiber by several methods. Despite the variations in chemical composition obtained by the different methods, details of the same basic structure are revealed. The epicuticle covers the fiber as a uniform layer, without being limited

to the individual scales. The exocuticle comprises several structural details: ridges, wavy structures running parallel to the scale edges; strings running between the scale edges and forming the top and bottom limitations of the edge at the overlappings; streakiness in the length direction of the fiber. 19 references.

Structure of flax fibre strands

D. R. Gilling and D. E. J. Samuels (H. M. Norfolk Flax Establishment). *J. Textile Inst. 44:* T609-T618 (December, 1953).

Investigations are described which demonstrate the presence of a succession of longitudinal fissures in strands of hackled retted flax fiber, attributable to a disruption of the binding materials between the ultimate fibers. When a tuft of fiber strands is cut into short segments, many of the strands break up into several smaller pieces, and the system of fissuring is characterized by the number-length curve. The experimental method of obtaining such a curve is described and the problem of sampling in order to obtain a representative curve is discussed. An equation is deduced from theoretical considerations, which expresses the results within the limits of experimental error. Curves have been fitted to the experimental results from four flaxes of widely different origin. Possible applications of the investigation are discussed.

Structure of wools and hairs

Aldred F. Baker. *Fibres 15:* 15-18 (January, 1954).

The author describes how the application of stereoscopic photography to the study of the wool fiber has led to a new conception of the architecture of the fiber, and particularly the shape of the so-called scales or protuberances.

THE TENSILE BEHAVIOR OF SOME PROTEIN FIBERS. George Susich and Walter Zagieboylo. Office of the Quartermaster General. Research and Development Division. 1953. 37p. Available from Office of Technical Services, Washington 25, D. C. $1.25. PB 111 235. Textile series report no. 80.

The tensile properties of wool, mohair, human hair, casein, Vicara, and silk, including their behavior when knotted, after repeated stresses (mechanical conditioning) and when swollen in water were investigated. The immediate elastic recovery, delayed recovery and permanent set of these fibers were measured by a cycling technique using the Instron tensile tester and the Sookne-Harris fiber extensometer. Wool has an

outstanding elastic recovery in the dry state and its elastic behavior is improved after mechanical conditioning and when wet. Mohair, human hair, and to some extent casein and Vicara, have elastic properties similar to wool. The tensile behavior of silk is different, being characterized by considerable permanent set (dry and wet) and by high immediate elastic recovery after mechanical conditioning.

Artificial fibers A 2

Casein fibres: fibrolane, merinova

P. A. Koch. *Z. ges. Textil-Ind. 55:* 1311-1316 (November 5, 1953); *in English.*

A detailed outline of the casein fibers, including the following: definition, trade names, development, raw materials, manufacture, chemical composition, properties, products, application, patents, and a bibliography of 72 references.

Hydrophilic synthetic fibres

Dyer 111: 51-54 (January 8, 1954).

Hydrophilic synthetic fibers will be easier to dye and more comfortable to wear.

Man-made fiber data sheets. Part 2. (Calcium-) alginate continuous filament yarn

Paul A. Koch. *Modern Textiles Mag. 35:* 42-46 (February, 1954).

A detailed outline, including: history, raw materials, manufacture, chemistry, properties, products, uses, patents, and a bibliography of 48 references. Originally published in *Deutsche Textilgewerbe 52:* 301-302 (June, 1950).

Strength and elongation of glass fibres and quartz wool after treatment with lyes or acids

G. Satlow. *Z. ges. Textil-Ind. 55:* 1297-1309 (November 5, 1953); *in English.*

The design of the experiment and the test results are discussed. 9 references.

The textile and dyeing properties of synthetic fibres

Ludwig Müller. *Textil-Praxis 8, No. 9:* 783-790 (1953); *in German.* Through *Brit. Cotton Ind. Research Assoc. 33:* 822 (December 31, 1953).

This article gives a survey of the different types of synthetic fibers. The countries, places, manufacturers, and names, of these fibers are listed. The author then discusses the properties of the various types as basic textile material. Their structure, behavior during processing, affinity for dyes, and economic importance, are com-

pared with those of the cellulosic rayons and the natural fibers.

Thermoelastic properties of synthetic fibres

J. F. Clark and J. M. Preston (Univ. of Manchester). *J. Textile Inst. 44:* T596-T608 (December, 1953).

Relations between tension and temperature at constant length and between length and temperature at constant load have been determined for Vinyon, Vinyon N and nylon. From these data the changes with elongation of the entropies and internal energy of the fibers were calculated. 13 references.

YARN PRODUCTION B

Card called core of new worsted system

Alfred D. Cook. *Daily News Record No. 26:* 28 (February 8, 1954).

A new short system of worsted and synthetic spinning, built around a recently developed duplex card (Proctor and Schwartz, USP 2 666 453, Jan. 12, 1954) and utilizing roll drawing is described. Advantages claimed for the technique include reduction of processes, including elimination of combing, with resultant work and capital equipment savings and production of yarns with a higher strength and superior evenness.

A handbook of twisting. Part 4. Twisting devices

Neal Truslow. *Textile Bull. 80:* 60-63 (January, 1954).

Insertion of twist in roving frames, flyer spindles, and cap spinning.

Improved Acrilan fiber

Harry E. New (Chemstrand Corp.). *Textile World 104:* 97-100 (February, 1954).

Manufacturing data on the improved Acrilan fiber are presented.

Improving spinning properties of cotton; a new chemical aid—Syton W/20

Indian Textile J. 64: 110-111, 80 (November, 1953).

Data are given for the use of Syton in 14 Indian mills.

Introduction to textile calculations. Part 8

N. C. Gee. *Textile Mfr. 80:* 27-29 (January, 1954).

Worked examples and exercises are given concerning calculations involved in wool and woolen blending, woolen carding machinery production and mule spinning production.

Means for preventing or dissipating electrostatic charges in textile machinery

F. C. Robinson (to T. M. M. Research Ltd.). BP 689 849, April 8, 1953. Through *Brit. Cotton Ind. Research Assoc. 33:* 814 (December 31, 1953).

Drafting rollers are coated with a lacquer or the like containing a radio-active substance that emits alpha or beta particles, for example, uranium oxide or polonium 210.

New throwing formulas predict effect of twist on filament yarns

D. S. Hamby and E. B. Grover (School of Textiles, N. C. State College). *Textile World 104:* 110-112, 218-220 (February, 1954).

Twist contraction can now be determined more accurately for production and fabric calculations. Processing tensions can be better set with new information on the effect of twist on elastic limit. Graphs and formulas, which can be easily changed to conform with local conditions, are given for continuous-filament nylon, Orlon, Dacron, acetate and viscose.

Nylon staple on the cotton system

Textile Merc. 130: 143-147, 155 (January 22, 1954).

Processing suggestions are given for 100% nylon staple yarns and for nylon blends.

Study of neps

D. DeMeulemeester, G. Raes and G. de Backer. *Ann. Sci. Text. Belges No. 2:* 5-38 (August, 1953); *in French.* Through *Brit. Cotton Ind. Research Assoc. 33:* 812 (December 31, 1953).

Fifteen different cottons were tested for neppiness. The main properties of the cottons were determined. Neps were counted in the raw material in two different ways: by direct counting and by a dyeing process. The raw material was fed to a standard card and the number of neps was evaluated by both methods. The structure (maturity) of the neps was examined microscopically. Two cottons were passed several times through the drafting frame in order to study the influence of this operation on the number of neps. Most of the neps were composed of dead fibers, the number in the card sliver did not differ greatly from the number in the raw material, and drafting had no appreciable effect on the number.

Twisting synthetic fibres

René Duval. *Industrie Text. No. 799:* 434-436 (June, 1953); *in French.* Through *Brit. Cotton Ind. Research Assoc. 33:* 643 (October 30, 1953).

A process and apparatus, in one unit, for the insertion of twist into synthetic filaments is described. Experimental methods for the drawing, twisting, and setting of yarns are given, including details of temperature, humidity and processing time.

Carding and Combing B 2

Comber lap preparation and combing

Whitin Rev. 21: 31-52 (January-February, 1954).

In this discussion Whitin answers critics of its article in the July-August 1953 issue of the *Whitin Review* which compared cost factors involved in comber lap preparation by two different methods: using Whitin ribbon and sliver lap machines or using lap winders and lap back drawing.

Drafting and Roving B 3

Balmes high speed drafting unit

K. Schlien. *Textil-Praxis 8, No. 9:* 737-742 (1953); *in German.* Through *Brit. Cotton Ind. Research Assoc. 33:* 813 (December 31, 1953).

A diagram of the Balmes drafting unit is shown to clarify comparative tests of yarns spun on three different types of drafting units. The yarn was tested with the Uster evenness tester and a breaking load tester. The drafting units on which the yarn specimens were spun are the Casablanca, the Le Blan Roth and the Balmes. The yarn specimens were three different types of cotton rovings of varying staple length, rayon staple fiber, and cotton-rayon blend. It was found that the efficiency of the Balmes drafting unit equals that of the two other systems in relation to producing yarn with a good tensile strength, but is inferior in the evenness of the yarn. The arrangement of the front condenser decreases breakages, but the position of the control cylinder over the two grooved drafting rollers, with their varying numbers of revolutions, causes slipping of the roving and thus uneven yarn.

Constants speed calculations for average roving run-outs

Marcus C. Gross. *Textile World 104:* 102-103 (February, 1954).

These tables of constants were calculated by dividing the pounds per spindle into the pounds of roving fed. The proper constant times the hours-per-week run gives the elapsed roving-running time. With this figure, the average roving run-outs are easily calculated.

Effect of spinning draft on yarn strength

P. P. Townend. *Wool Rev. 27:* 39 (January, 1954).

A brief account of some experiments with Australian wool. Increased draft in spinning with this wool gave a stronger yarn but it was concluded that too great a draft might result in an uneconomical increase in ends down.

The selfactor draft and its draft systems in carded wool yarn spinning

Bruno Kagi. *Z. ges. Textil-Ind. 55:* 1232-1235 (November 5, 1953); *in English.*

Drafting systems for carded wool yarn.

The top rollers of the drafting-unit

Wilhelm Stahlecker. *Textil-Praxis 8, No. 9:* 763-765 (1953); *in German.* Through *Brit. Cotton Ind. Research Assoc. 33:* 813 (December 31, 1953).

A brief description of various types of top rollers is given. The development from designing a drafting-unit with combined fixed top rollers on plain bearings to the new way of arranging top rollers in pairs running on ball bearings is described. Some directions for the most efficient design of drafting units, the most suitable materials for roller cots and fluted rollers, and current measurements for the most frequently used types, are given.

Spinning B 4

Arunco large package doubler-twister

Arundel Coulthard & Co. Ltd. *Textile Recorder 71:* 85-86 (January, 1954).

A versatile multi-purpose machine with a range of production extending from fine nylon to heavy carpet yarns.

Hand brake for spindles

Whitin Rev. 21: 53-56 (January-February, 1954).

A new hand brake is described for Whitin wool frame spindles and several types of Whitin twister spindles.

Hydraulic on ring twisting frames

Z. ges. Textil-Ind. 55: 1258-1265 (November

5, 1953) ; *in English.*

A new ring twisting frame by the German firm Hagenuk featuring: (1) elimination of winding sets and cams by use of a hydraulically controlled ring rail, and (2) Kopp variator which allows change of yarn twist without changing gears. The construction and working of both features are described.

Illuminating spinning frames by concentrated beam

Meiners Optical Devices Ltd. *Textile Mfr. 80:* 24 (January, 1954).

Twin beam yarn illuminator consists of a single lamp box connected by square section tubes to reflector heads fitted with mirrors and lenses, through which horizontal beams of light are projected to illuminate the yarns above the spindles along the whole length of both sides of a frame.

Simplified change-wheel calculation

L. Goossens. *Rayonne et Fibres Synthet. 9, No. 9:* 131 (1953) ; *in French.* Through *Brit. Cotton Ind. Research Assoc. 33:* 813 (December 31, 1953).

A simple expression is given for calculating the gear wheels required when changing from one count to another on roving or spinning frames. The novelty of the method is that it overcomes the necessity of calculating or looking up square roots.

Yarn preparation the Schweiter way

C. A. Crowther. *Textile Merc. 130:* 25-27, 30 (January 1, 1954).

Schweiter's (Switzerland) high speed cone winders and automatic pirn winders are described.

FABRIC PRODUCTION C

Yarn Preparation C 1

The adverse effect of irregular tension in the warping of rayon

E. O. Hesse. *Rayonne et Fibres Synthet. 9, No. 8:* 17-18 (1953) ; *in French.* Through *Brit. Cotton Ind. Research Assoc. 33:* 816 (December 31, 1953).

The decline of tensile strength of rayon yarns and woven fabrics is frequently caused by irregularities in tension during warping. Suggestions as to size of bobbins, arrangement of bobbins on creels, and methods for the winding of these bobbins, are made.

A conditioning machine for spun rayon cops

Hergeth K. G., Dulmen, Germany. *Skinner's Silk & Rayon Record 28:* 57 (January, 1954).

The Hergeth machine has a damping process which applies the conditioning liquor to the bobbins by turbo-brushes, controlling moistening within very narrow limits. It is designed to give a continuous conditioning treatment to small cops, pirns, bobbins and cross-wound bobbins.

Homogenized size

Southern Textile Association, South Carolina Division. *Textile Ind. 118:* 110 (Jan. 1954).

Installation of automatic weft-winding machinery

V. Luzet. *Rayonne et Fibres Synthet. 9, No. 10:* 19-21 (1953) ; *in French.* Through *Brit. Cotton Ind. Research Assoc. 33:* 815 (December 31, 1953).

Automatic winders ensure regular supply of weft packages to the looms in a weaving shed. As the installation of such machines represents a considerable initial expense, a simple method is described for calculating the correct number of spindles that are required to keep up an even weft supply to the looms, thus eliminating high production costs.

Modified starches; their properties and application in sizing and finishing

John B. Clark. *Textile J. Australia 28:* 1096-1100 (November 20, 1953).

A general survey of starches and sizing.

Moisture regain in wool yarns

Textile Age 18: 28-29 (February, 1954).

European and British practice in commercial handling of the problem of moisture regain in wool yarns is compared with that in the United States.

A new pattern warper

W. Schlafhorst & Co., M. Gladbach, Germany. *Z. ges. Textil-Ind. 55:* 1236-1238 (November 5, 1953) ; *in English.*

The new Schlafhorst CZU pattern warping head, a heavier machine for easier attendance and use with a larger number of looms.

Simultaneous sizing and fugitive tinting of viscose crepe

A. Bassi and E. Rudelli. *Rayonne et Fibres Synthet. 9, No. 8:* 11-15 (1953) ; *in French.* Through *Brit. Cotton Ind. Research Assoc. 33:* 816 (December 31, 1953).

Certain dyestuffs produced by Ciba, Sandoz

and Geigy were found suitable for tinting cakes, hanks, and other packages, of viscose crepe yarns. Certain agents with properties similar to those of linseed oil, but without its disadvantages, were used successfully in the sizing mixture.

Some aspects of sizing technology

D. A. Whitehead. *Textile Mfr. 80:* 15-17 (January, 1954).

A general review.

Winding machines for warp yarns

J. Schneider. *Reyon Zellwolle u. Chemiefasern. 31, No. 8:* 437-448 (1953); *in German.* Through *Brit. Cotton Ind. Research Assoc. 33:* 815 (December 31, 1953).

The advantages of winding warp yarns on cheeses, bobbins, or cones, are discussed. The author then describes the different designs of thread guiding and tensioning devices for cross-winding, and the various types of winders most suitable for different kinds of warp yarns.

Weaving C 2

Electric warp stop-motions

W. Middlebrook. *Textile Mfr. 80:* 25-26 (January, 1954).

A detailed description of the Crompton and Knowles electrical warp stop motion is given.

Increase loom production up to 5% with lizards

W. C. Westbrook. *Textile World 104:* 108-109, 214-216 (February, 1954).

Loom stops from filling breaks can be eliminated on many types of cotton cloth if the filling-fork lizards are put to work.

Looms without superstructure

J. Schneider. *Z. ges. Textil-Ind. 55:* 1245-1257 (November 5, 1953); *in English.*

A technical discussion of the advantages, development and features of looms without superstructure. A number of specific models are illustrated and discussed.

Shuttle running. Part 1

Wilfred Bowden. *Textile Wkly. 53:* 176-178 (January 15, 1954).

The function, design, and movement of the shuttle in relation to optimum loom operation.

Shuttle running. Part 2

Wilfred Bowden. *Textile Wkly. 53:* 250-254 (January 22, 1954).

Shuttle running in relation to picking and the shuttle box are discussed.

Weaving and kindred processes. Part 2

A. T. C. Robinson. *Skinner's Silk & Rayon Record 28:* 60-61 (January, 1954).

Various types of shedding motions now in current use are described.

Weaving looms for hard fibre fabrics

A. Hoffman. *Z. ges. Textil-Ind. 55:* 1238-1245 (November 5, 1953); *in English.*

The special looms and attachments needed for weaving sisal, agave, and coir fibers are described. These looms are manufactured by the Bergedorfer Eisenwerk AG., ASTRA-Werke, Germany.

Knitting C 3

Fancy knitting without selecting mechanisms

J. B. Lancashire. *Textile Recorder 71:* 77-79 (January, 1954).

The action of the Mellor Bromley 4-SAD3 sinker-type circular machine is discussed.

Fitting quality of F. F. hosiery. Part 1

Joseph C. Cobert. *Knitter 18:* 44-46 (January, 1954).

Proper designing and preboarding of full-fashioned stockings.

Special Fabrics C 4

Better tires from modern tire cord

Cyril A. Litzler. *Modern Textiles Mag. 35:* 32-33, 54-66 (February, 1954).

A report on tire cord fabrics with emphasis on nylon. General processing requirements and techniques are summarized. Many graphs and processing diagrams.

Cloth setting reconsidered. Part 4

S. Brierley. *Textile Mfr. 80:* 45-46 (January, 1954).

Whipcord effects can be obtained from any regular twill weave by suitable arrangement of the setting.

Construction of upholstery-fabrics

J. Miss. *Textil-Praxis (English ed.) No. 4:* 158-162 (November, 1953).

This article points out special problems of upholstery fabric production and design. A number of designs are described and illustrated.

Dacron and cotton form happy union

Jerome Campbell. *Modern Textiles Mag. 35:*

31,52 (February, 1954).

Development of a blend of Dacron and cotton for men's shirts which combines the comfort and good looks of cotton with the long-wearing strength and easy maintenance qualities of Dacron.

A decimal classification for fabrics

Jean Deck. *Melliand Textilber. 34:* 1037-1038 (November, 1953); *in German.*

The author suggests a systematic method on the decimal system for the classification of fabrics.

Design in woven fabrics. Part 15. Step effects

Wool Rev. 27: 35-37 (January, 1954).

A number of step effects are analyzed and illustrated.

Fabric woven with 2 figuring wefts and 1 ground weft for coloured borders of tablecloths

Rudolf Koenig. *Melliand Textilber. (English ed.) 34, No. 2:* 152 (1953).

The point draft and method of reeding-in the fabric is briefly described and illustrated.

Fancy spring-needle jerseys

James H. Blore. *Textile World 104:* 104-105, 229-232 (February, 1954).

Pile fabrics, open-work designs, tuck designs, and rubber swim-wear fabrics can be made on spring-needle sinker-top machines. Details are given for five fabric types: fancy eyelet, plain eyelet, blister, elastic, and twill.

Fancy weaves designed by the "winding" system

Hildegard Zimmerman. *Melliand Textilber. (English ed.) 34, No. 2:* 150 (1953).

Further studies in textile design. Part 1. Broken cords and splash effects

Textile Recorder 71: 70-72 (January, 1954).

In this second series of articles, certain styles have been selected for discussion and illustration which are unusual in so far as they differ from the usual checks, herringbones, and the like. At the same time, they are within the capabilities of the average shed equipped with dobby looms and may serve to suggest other effective designs derived from the same, or similar, basic pattern.

Modifications in marl tweeds

Wool Record 85: 92,94 (January 14, 1954).

Modifications for securing textures in which twist and single yarns are about equally proportioned, making the greatest possible use of the twist or marl element for effect.

Saxony coating tweeds

Wool Record 84: 1561-1562 (December 31, 1953).

Several yarns and weaves are given.

Textile scaffolding threads. Part 23. The functions of the removable carrier thread

Arthur Johnson. *Skinner's Silk and Rayon Record 27:* 1388-1390 (December, 1953).

Structure of pile fabrics. The order in which the floats of fancy yarn are arranged in the design is discussed.

Textile scaffolding threads. Part 24. The functions of the removable carrier thread

Arthur Johnson. *Skinner's Silk & Rayon Record 28:* 62-63 (January, 1954).

Development of pile fabrics with loops on both sides of the cloth by the soluble rayon method.

Worsted suitings: colour and weave effects

Wool Record 85: 28,37 (January 7, 1954).

STANDARD FINISHING D

The drying of yarn in hank

Fleissner and Sohn, Egelsbach, Germany. *Textile Merc. 130:* 109,115 (January 15, 1954).

The Fleissner short-chamber, chainless, continuous dryer for hank yarn is described. Important economies are claimed.

Good tentering essential to quality print goods

J. Downey. *Textile Age 18:* 30-33 (February, 1954).

Proper selvage construction is emphasized.

High temperature nylon setting machine

Bates Textile Machine Co. (Leicester) Ltd. *Skinner's Silk & Rayon Record 28:* 58 (January, 1954).

In this model K machine the heating of fabric is by contact with hot metal. The fabric is held against the metal surface by special heat resisting endless blankets. Great economy is claimed.

Recent developments in bleaching and scouring. Part 1

Textile Recorder 71: 73-76 (January, 1954).

The first of a series of three articles reviewing the trend of development in bleaching, scouring and related preparatory processes, in dyeing and

printing, and in a variety of finishing treatments. 39 references.

Setting nylon and other synthetic fabrics by radiant heat

Textile Merc. 130: 101-103 (January 15, 1954); *Textile Wkly. 53:* 180-183 (January 15, 1954).

Description of radiant heat setting apparatus developed by General Electric Co. Ltd. in collaboration with British Nylon Spinners Ltd. and George Pearson and Sons Ltd. (finisher).

Sodium chlorite in the textile industry

K. T. Merz. *Textile J. Australia 28:* 1204-1205, 1210-1211 (December 21, 1953).

A table shows the results of studies on sodium chlorite as an oxidizing agent in the development of a series of indanthrene vat dyeings. Sodium chlorite has a limited use as an oxidizing agent. It can, however, be used to advantage with certain dyestuffs to prevent fiber tendering.

THPC, new flame-resistant treatment, is permanent and effective

Wilson A. Reeves and John D. Guthrie (Southern Regional Research Laboratory, New Orleans, La.). *Textile World 104:* 101,176-182 (February, 1954).

SRRL research, supported by the Quartermaster Corps, has developed a new flame-resistant treatment for cotton. This treatment is applied on conventional machinery and is said to give (1) permanent flame resistance, (2) improved wrinkle resistance, (3) rot resistance, and (4) mildew resistance.

Textile Recorder exhibition

J. Textile Inst. 44: P806-P810 (December, 1953).

Dyeing and finishing machinery, by H. W. Best-Gordon, p. P806-P807 and *Auxiliary equipment,* by R. G. Gargher, p. P807-P810.

Vat-dyed shrink-resistant rayons

A. J. Hall. *Textile Merc. 130:* 103-107 (January 15, 1954).

A combined dyeing and finishing process for viscose rayon (BP 693 497) is described in detail.

DYEING AND PRINTING E

Acrilan—the acrylic fibre, and blends

Jackson A. Woodruff. *Can. Textile J. 71:* 78-82 (January 29, 1954).

Modifications have resulted in improvement

in the dyeing properties of Acrilan. Properties and uses are discussed.

Basic principles of dyeing Orlon

D. J. Crawford. *Can. Textile J. 71:* 61-70 (January 29, 1954).

The physical and chemical properties of Orlon are discussed along with the differences between the various types of Orlon and the principles of dyeing the fiber by the various methods now available.

Control of padding processes by radioactive isotope labelling

H. B. Hampson and E. W. Jones. *J. Soc. Dyers Colourists 69:* 620-628 (December, 1953).

Industrial uses of radioactive isotopes are briefly surveyed. Experiments show that radioisotope techniques may conveniently be employed to control the regularity of padded cloth, both across its width and throughout its length.

Developments in the application of azoic dyes in printing

B. Jomain. *J. Soc. Dyers Colourists 69:* 661-666 (December, 1953).

Cotton Spinning and Weaving

A record of service as measured by

New plants	149
Major additions	387
Minor additions, reports, appraisals	1,921
Total engagements	2,457
Cost new plant and major additions	$210,000,000

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A brief review is made of the development of azoic dyes for printing, from the original application on beta-naphthol prepares, via the Rapid Fast and Rapidogen ranges, to the recently introduced neutral-steaming dyes. The application of these new dyes in multicolor styles is discussed in some detail.

Doctor streaks—their origin and prevention

Emil A. Krahenbuhl. *J. Soc. Dyers Colourists 69:* 561-568 (December, 1953).

Based upon the theory that excessive friction between doctor blade and roller surface is the primary cause of roller damage and can provoke this trouble even in print pastes containing no trace of solid matter, the author reports on trials with a printing assembly linked with a friction-measuring device. The entirely different behavior of thickenings with high and others with low dry content gives evidence of their varying working properties. It is shown that the use of thickenings with high dry content, addition of lubricants to print pastes containing low dry content thickenings, and especially replacement of copper rollers by chromium-plated ones, will in most cases eliminate the causes of roller damage. There is, however, an indication that changes of pH may completely alter the friction characteristics of thickenings and that with more and more ingredients present in the print pastes their performance becomes increasingly unpredictable and requires closer investigation.

Dye transfer in dyeing and printing

G. D. Myers and H. A. Turner. *J. Soc. Dyers Colourists 69:* 648-660 (December, 1953).

The results obtained in the study of dye transfer from thickener to fiber-substance, during steaming, for a number of different classes of dyes, have been compared with the results of parallel work on dyeing in order to demonstrate the essential similarity of the two methods of coloration. 32 references.

Dyeing Acrilan acrylic fiber with vat dyes

DuPont Tech. Bull. 9: 188-192 (December, 1953).

Results obtained from the application of a selected range of vat dyes to Acrilan are shown with tables.

Dyeing and finishing Dynel and Dynel blends

T. A. Feild, Jr. and H. K. Townsley. *Can. Textile J. 71:* 49-60 (January 29, 1954).

Essentials of the practical dyeing and finishing of Dynel and Dynel blends are discussed and general properties of the fiber are enumerated. The more important classes of dyes being successfully applied to Dynel are listed.

Dyeing and finishing of Terylene

P. T. Standring. *Can. Textile J. 71:* 83-95 (January 29, 1954).

The properties and uses of Terylene are enumerated. Its dyeing and finishing are also discussed.

Dyeing reactions. Part 6

H. G. Fröhlich. *Z. ges. Textil-Ind. 55:* 1267-1273 (November 5, 1953); *in English.*

A study of the reaction of acid chromium-complex-dyestuffs with modified protein fibers is reported. Experimental data are given. 15 references.

Dyeing union shades on blends of Dacron or Orlon with wool

Lonnie T. Howard (Amer. Assoc. Textile Chemists and Colorists. Clemson College Student Chapter.) *Am. Dyestuff Reptr. 43:* P48-P49 (January 18, 1954).

The dyeing of solid shades of good fastness properties on blends of wool with Dacron or Orlon is a difficult problem. The authors have devised a method of dyeing vat dyes on such blends to obtain shades of good fastness to light, washing, drycleaning and crocking. A vat dye in dispersed-pigment form is padded onto a blend fabric in a composition containing, among other things, an acrylonitrile latex, and the fabric is dried. The latex fixed in drying permits fixation of the vat dye on the blend during subsequent reduction and oxidation. The method has also been varied, where vat pigment is not firmly fixed on the wool in drying, by soaping off the pigment from the wool before fixing the vat dye and later dyeing the wool of the blend with any of the fast dyes suitable for wool alone.

Dyeing with vat dyes at high temperatures

American Cyanamid Co. Brit. Pat. 693 251. Through *J. Soc. Dyers Colourists 69:* 389 (October, 1953).

Cobalt and its compounds prevent decomposition and dulling of the dyeings when vat dyes are dyed at temperatures at which they are normally susceptible to over-reduction.

Dyes recommended for hydrophobic fibers

DuPont Tech. Bull. 9: 172-177 (December, 1953).

A list of dyes suitable for application to hy-

drophobic fibers has been compiled as a ready reference. References are given to detailed information previously appearing in the *Technical Bulletin* concerning dye application to various synthetics.

Fast red SW base special

Hermann Freb. *Textil-Praxis (English ed.) No. 4:* 182-184 (November, 1953).

The variety of naphthol AS dyes has increased as a result of the introduction of several new naphthols and diazo components. The claim is made that the combination naphthol AS1SW-Fast Red SW Base Special produces a brilliant red with high fastness qualities.

Fast-to-light basic prints on viscose rayon

W. S. Miller. *J. Soc. Dyers Colourists 69:* 612-619 (December, 1953).

In the past the brightest prints on viscose rayon have been obtained with acid and direct dyes, but these lack washing fastness, and many of the brightest acid dyes are also fugitive to light. The author shows how basic dyes, hitherto notoriously fugitive to light, may be printed by a new all-in method, resulting in the deposition within the fibers of color lakes of molybdophosphoric acid. A number of stages in the development of this new printing technique are described, and are related to the earlier development of the manufacture of similar lakes in pigment form. The new prints are fast to light and washing, and may be supplemented where necessary by use of insoluble azo dyes applied by suitable methods. 38 references.

Fast to light direct dye combinations and the possibility of a negative influence on their fastness

Heinz Hansen. *Z. ges. Textilindustrie 55, No. 17:* 1031-1038 (1953); *in German.* Through *Brit. Cotton Ind. Research Assoc. 33:* 697 (November 14, 1953).

Complaints have frequently been made that fast individual dyes lose their fastness when combined with other fast dyes to obtain variations of hue and shade. The author refers to his previous publications on this subject containing advice on the avoidance of trouble caused by such dye combinations. He adds that crease-resistance finishes frequently contribute to those shortcomings and he advises methods of avoiding them by the use of such agents as: "Kaurit, K. F." produced by Badische Anilin- und Soda-Fabrik, "Komakrin, SA24" by Degussa, Frankfurt (a. M.) and "Knittex" by Pfersee, Augsburg. These

are water-soluble urea-formaldehyde precondensates.

Flow properties of textile printing pastes

R. L. Derry and R. S. Higginbotham. *J. Soc. Dyers Colourists 69:* 569-575 (December, 1953).

The color pastes employed in the machine printing of textiles are rheologically complex fluids, the viscosity coefficient falling with increase in rate of shear or shearing stress. In order to relate the viscosity of a paste with the quality of the resulting print, it is essential that the measurements of apparent viscosity should be made at the operative shearing stresses.

Fluorescent brightening of textiles

A. Landolt. *Textil-Rundschau 8:* 337-345 (July, 1953). Through *J. Soc. Dyers Colourists 69:* 471 (November, 1953).

A list of eleven Uvitex (Ciba) products, their properties, and the principles of their application are given. The measurement of the degree of brightening is discussed. At present there is no appropriate standard light source with the correct balance between ultraviolet radiation and visible light. With an ordinary ultraviolet lamp, the light emission of patterns treated with various fluorescent brightening agents is measured, and the effects of varying temperature, time, and concentration of agent and of salt in application is illustrated by graphs. From the reduction in intensity of the fluorescence by a washing treatment at 40°C. for 30 minutes with 5g. of soap per liter, the percentage of agent removed from various materials is calculated.

Historical notes on the wet-processing industry. Part 1. How Napoleon aided the early dyeing industry of France

Sidney M. Edelstein. *Am. Dyestuff Reptr. 43:* 33-34 (January 18, 1954).

The first in a series of historical articles.

Investigation of the chemical reactions involved in the use of sodium formaldehyde-sulfoxylate in textile printing

R. J. Hannay and W. Furness. *J. Soc. Dyers Colourists 69:* 596-605 (December, 1953).

In discharge printing with sodium formaldehyde-sulfoxylate, reduction of the dye is accompanied by oxidation of the formaldehyde-sulfoxylate to formaldehyde-bisulfite. Although some preliminary decomposition has been noted during drying of the cloth immediately after

printing, the main object of this investigation has been to determine the extent, and to trace the products, of decomposition of the formaldehyde-sulfoxylate during the steaming of a printed and dried filament viscose-rayon crepe. Methods of analysis are described.

Light and crocking fastness of sulfur dyes on cotton

DuPont Tech. Bull. 9: 201-203 (December, 1953).

This report shows Fade-Ometer and crocking fastness ratings for Du Pont sulfur dyes on cotton. The direction of fade has also been included.

Melange or Vigoureux printing

F. Buxtorf and A. Wiazmitinow. *J. Soc. Dyers Colourists 69:* 550-556 (December, 1953).

This paper describes the equipment and the methods used in the Vigoureux printing process for wool, rayon staple, and polyamide fiber slubbing. 8 references.

Mill procedures for dyeing and finishing Orlon

Howard P. Brokaw. *Can. Textile J. 71:* 71-77 (January 29, 1954).

The new type 42 Orlon acrylic staple is a dyeable fiber. Dyeing processes are discussed in relation to commercial practice with various types of mill equipment. Some finishing processes are also discussed.

New developments in the application of phthalocyanines in textile printing

F. Gund. *J. Soc. Dyers Colourists 69:* 671-682 (December, 1953).

A completely new method of using phthalocyanines in textile printing was introduced by the discovery of the Phthalogens, from which the phthalocyanine pigment may be produced in the fiber. Special methods of application were developed, which are characterized by the use of 10-20% of special solvent mixtures, the Levasols, in the aqueous printing pastes containing the intermediate product and the metal, the latter in the form of a soluble salt or as a complex compound.

Notes on dyeing tub-fast colors. Part 4

F. O. Stone. *Knitter 18:* 51-53 (January, 1954); *Textile Bull. 80:* 75-77 (January, 1954).

Background information on naphthol dyes and their application is given.

Observations on textile printing in the U. S. A.

Otto Habel. *J. Soc. Dyers Colourists 69:* 683-687 (December, 1953).

Textile printing in the U. S. A. is discussed with particular emphasis on the more recent developments. The paper deals in the main with machine and screen printing, but passing reference is made to hand block and spray printing.

Printing efficiency of vat dyes

A. G. H. Michie and R. Thornton. *J. Soc. Dyers Colourists 69:* 629-647 (December, 1953).

A method of assessing vat-dye prints has been established involving determination of the amount of dye applied to a cotton fabric by a roller printing technique, and the amount fixed at various stages during the afterprinting processes. By extracting the vat dye from the fabric and determining optically the amount present in a given area it is possible to calculate the percentage dye fixation under a variety of conditions. 11 references.

Production of metal screens

G. Waller. *J. Soc. Dyers Colourists 69:* 557-560 (December, 1953).

A new method of producing printing screens from metal is described. Although the method requires a higher degree of technical skill and additional capital outlay compared with normal methods, improved results are obtainable in the life and accuracy of registration of screens, and in addition it is possible to gain greater control over the quality of printing by variation of the screen mesh.

Production of pictorial effects in textile printing

N. W. Yelland. *J. Soc. Dyers Colourists 69:* 538-549 (December, 1953).

As occasionally required, photographs, pictures, etc., could be reproduced by printing on textiles in color or monochrome, if means could be found to engrave intaglio rollers so that they would print precisely the required graduated density of color at each point of the surface. Experiments are described which were made to ascertain what color-tones are produced by various strengths of engraving of two possible types—(1) intaglio half-tone (graduated cell-area) and (2) photogravure (graduated depth of etching). Tone values were obtained by calculation from reflectometer measurements on the prints. 7 references.

Production of printing rollers by electrodeposition

E. A. Ollard. *J. Soc. Dyers Colourists 69:*

529-537 (December, 1953).

The process and the plant for depositing printing rollers are described in detail, and also the process employed for facing rollers with chromium.

Reduction of vat dyes in printing pastes

W. J. Marshall and R. H. Peters. *J. Soc. Dyers Colourists 69:* 583-595 (December, 1953).

The relation between the reduction properties of vat dyes measured under conditions akin to practice and their printing properties has been examined. Leuco potentials have been determined from electrometric titrations in aqueous solutions, and they have been found to govern the sensitivity of the dyes to the Formosul concentration. 8 references.

Resists under azoic dyes

J. Frei. *J. Soc. Dyers Colourists 69:* 667-670 (December, 1953).

The introduction of Variamine Blue has given a new impetus to resist printing. The most usual methods—resists by the lead chromate and aluminium chlorate processes—are described, and new possibilities are indicated of producing resists under red, orange, scarlet, and bordeaux diazo components.

Stripping basic dyes from Orlon type 42 acrylic fiber

DuPont Tech. Bull. 9: 185 (December, 1953).

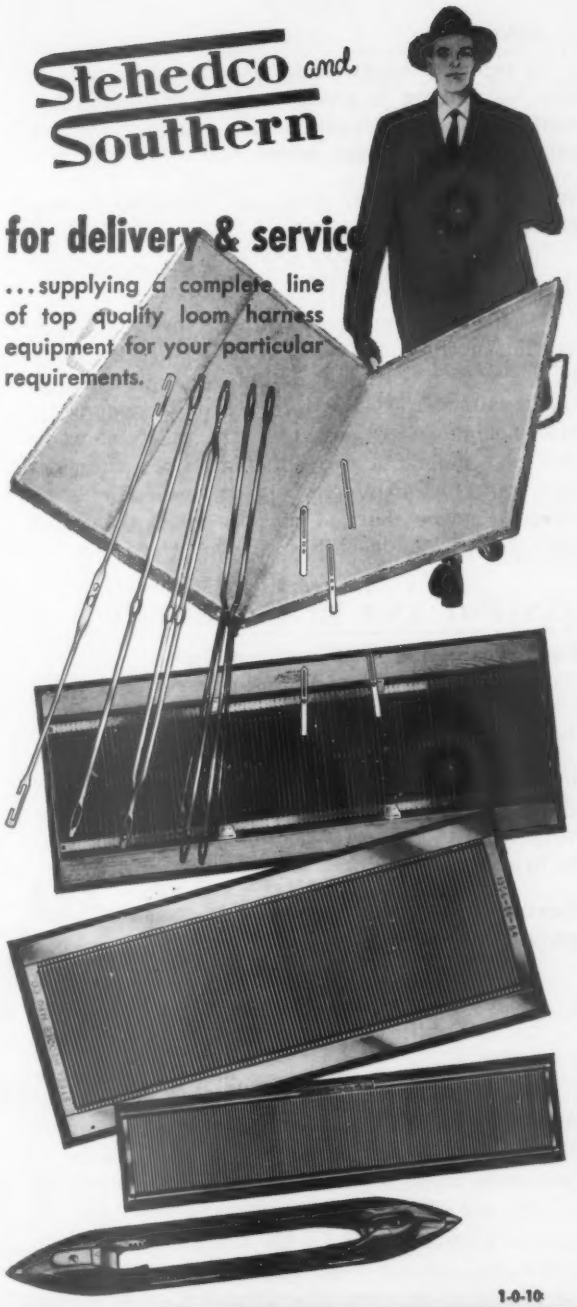
Thiourea dioxide (formamidinesulfinic acid); a new reducing agent for textile printing

P. Krug. *J. Soc. Dyers Colourists 69:* 606-611 (December, 1953).

Thiourea dioxide, an oxidation product of thiourea, is a reducing agent which is stable both in solid form and in cold aqueous solution. It has a slight acidic reaction, and acquires full reducing power only when heated in aqueous solution to about 100° C. This paper briefly describes the chemistry of thiourea dioxide, and deals with it as a reducing agent for vat dyes in the direct and discharge printing of cellulose acetate, silk, and wool. Owing to its acidic properties, these fibers can be printed with a minimum of degradation and great safety of production. The new reducing agent has been tried on a practical scale, and results of trials are demonstrated.

Use of phenyl methyl carbinol in dyeing Dacron polyester fiber

DuPont Tech. Bull. 9: 179-184 (December,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1953).

A recent product examined for use as a carrier for Dacron is phenyl methyl carbinol. Advantages and disadvantages are summarized and experimental data are given.

Water-insoluble azoic dyes for simplified dyeing processes

A. J. Hall. *Skinner's Silk & Rayon Record 28:* 54-56 (January, 1954).

Three main methods are described for stabilization of the diazotized amine so that it can be mixed with the naphthol before application to the textile material. More recent developments are then discussed in which the insoluble azoic dye or pigment is formed apart from the fiber and made into a temporarily water-soluble form. Then it can be changed back by alkali treatment into its original insoluble form on the fiber.

TESTING AND MEASUREMENT G

Colour sampling with artificial light

Textil-Praxis (English ed.) No. 4: 157 (November, 1953).

Selection of the proper light is of decisive importance for an accurate examination of color. A new type bulb that emits a spectral composition very close to that of "medium natural daylight" is briefly described.

Deviations in instrumental evaluation of the physical properties of cotton

T. H. Hopper and J. D. Tallant (Southern Regional Research Laboratory, New Orleans, La.). *Textile Research J. 24:* 53-57 (January, 1954).

Through interlaboratory testing of samples of nine lots of blended cottons, data have been obtained to indicate deviations in test results as presently obtained in and between laboratories in the use of the Fibrograph, Pressley, and Micronaire instruments for the evaluation of length, strength, and fineness, respectively. Agreement or precision between laboratories may be greatly improved by adherence to a single source of test procedures, use of standard atmospheric conditions of 65% R. H. and 70°F, and general use of standardized check cottons to maintain a uniform level of testing. 4 references.

Evaluation of sea-water laundry detergents. Part 2

Rubin Bernstein and Harry Sosson (Phila. Naval Shipyard). *Soap Sanit. Chemicals 30:*

46-49, 99-100 (January, 1954).

See abstract for part 1 in *Textile Technology Digest 10:* 1447 (October, 1953).

Fastness properties of acetate dyeings after-treated with curable resins

James M. Polito (Amer. Assoc. Textile Chemists and Colorists. Fairleigh Dickinson College Student Chapter.). *Am. Dyestuff Reptr. 43:* P50-P52 (January 18, 1954).

Although the effect of curable resin finishes on the fastness of direct dyes on viscose rayon has already been studied, nothing has yet been published on the effect of such resins on disperse dyes on the acetate component of mixed fabrics. A study has been made of the effect of urea-formaldehyde, melamine-formaldehyde, and of a water-repellent finish on the fastness to light and fastness to gas fading of disperse (acetate) dyes on acetate.

The influence of the dyeing method on the utility of wool

Paul Fink. *Textil-Rundschau 8:* 279-302 (June, 1953); 346-368 (July, 1953); 543-557 (October, 1953); 613-622 (November, 1953); *in German.*

To test the influence of various dyeing processes on the utility of wool, loose wool stock was dyed by various methods in common use, and was afterwards subjected to a series of treatments as can occur during the use of woolen articles, such as: (a) exposure to light (sun and ultraviolet light), (b) mild washing, (c) moist heat, (d) acid, (e) exposure to light and subsequent washing. Testing procedures and results are presented. Long English summary in *Dyer 111:* 106-108 (January 22, 1954).

Irregularity in textile yarns and strands: a literature survey

Malcolm A. Sanborn (Bates Mfg. Co., Lewiston, Maine). *Textile Research J. 24:* 86-96 (January, 1954).

A comprehensive survey of instruments available for measuring uniformity, and the methods and formulas used for evaluating data; such as the correlogram, the Martindale formula, and various adaptations of the Martindale formula, such as Enrick's, Casby's and Chandler's. 85 references to the literature are cited. The discussion is limited primarily to cotton fibers and yarns.

[1536]

On the problems of determination, measurement, and prevention of damage to fibres by exposure to sunlight

A. Sippel. *Reyon, Zellwolle u. Chemiefasern 31, No. 9:* 494-499 (1953); *in German.* Through *Brit. Cotton Ind. Research Assoc. 33:* 826 (December 31, 1953).

Several tests are described that were carried out with varying wave-lengths of ultra-violet rays, and controlled humidity, on fibers of natural and man-made origin. It was found, that rays of a short wave-length, and only a small increase of the humidity of the air, caused considerable damage to natural and man-made protein fibers and to some of the polyamides. Natural and man-made cellulose fibers showed a much greater resistance to light. The greatest stability was seen in fibers of the vinyl, acrylic, and polyethylene groups; also fiber glass, which is not influenced by sunlight. It is suggested that the more hygroscopic a fiber is, the less resistant it is to light. Suggestions for precautionary treatment are made. Antistatic preparations of oily composition, used during the washing and bleaching processes, and certain protective agents added to

[1537]

dye-baths, and dyes that themselves react protectively, are discussed. Nine references are given.

Quality control in cotton spinning

L. H. C. Tippett. *Textile Wkly. 53:* 168-174 (January 15, 1954).

A critical review of the important factors in instrumentation and statistical applications of quality control of raw materials, processing conditions, yarn uniformity and production, by the leading authority on textile statistical quality control in Great Britain. The discussion that followed this lecture is presented in *Textile Wkly. 53:* 231-232 (January 22, 1954).

Quality control through statistical methods. Part 5. Control charts

Norbert L. Enrick. *Modern Textiles Mag. 35:* 35,72,74-75 (February, 1954).

In this fifth instalment of a series of eight articles, quality control charts are discussed as regards their construction and actual mill use. The presentation includes charts for averages and ranges, special charts for control of test method, vendor quality and machine efficiency. Illustra-

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tive examples are taken from scouring of woolen yarn, pH measurements, weight control of carpet yarns, vendor quality, and knitting production. A simplified presentation of the statistical background explains the development of ready-made constants for calculating limits for control charts.

Tests for differentiating between Orlon type 41 and type 42 acrylic fiber

DuPont Tech. Bull. 9: 178 (December, 1953).

Two simple tests are given.

Yarn evenness and its determination

A. Hasler and E. Honegger (Swiss Federal Inst. of Technology, Zurich, Switzerland). *Textile Research J. 24:* 73-85 (January, 1954).

A report of the results of application of the Martindale formula in evaluating evenness of cotton, from card sliver through yarn. Tensile strength data are shown for some of the yarns tested. It is claimed in the article that yarn evenness, spinning performance and yarn strength are correlated. However, no data are furnished to support this finding. 10 references. This paper originally appeared in German in the February 1953 issue of *Textil-Rundschau.*

Clothing and Fabrics G 1

AIR PERMEABILITY OF PARACHUTE CLOTHS. PART 1. M. J. Goglia. Wright-Patterson Air Force Base, Ohio, Wright Air Development Center, November, 1952. WADC Technical Report 52-283, Part 1. 126 p.

This study is concerned with the determination of the air permeability of nylon-type fabrics used in the manufacture of parachutes, and includes the experimental determination of the air flow through samples of the various fabrics under conditions of pressure differentials across the cloth up to 50 inches of water. The report deals also with the analysis and technique employed in the determination of the characteristic length parameter for characterization of the geometry of the ten parachute cloths. The literature survey includes 72 references, 60 with abstracts.

AIR PERMEABILITY OF PARACHUTE CLOTHS. PART 2. H. W. S. LaVier. Wright-Patterson Air Force Base, Ohio, Wright Air Development Center, August, 1953. WADC Technical Report 52-283, Part 2. 134p.

These studies are to determine the air permeability of nylon, Orlon, and Dacron parachute-type fabrics. The effects of denier and fabric

weave geometry on air permeability are the object of the research. The number of ends per inch in warp, and picks per inch in the filling, and denier of yarns was found to affect air permeability. The finishing of the fabrics was found to affect the permeability more than any other of the many variables involved. The tests to determine the effect of variation of the weave pattern failed to show significant differences on this account.

Analysis of warp-knitted fabrics. Part 3. Methods of determining fabric structure and manufacturing particulars from small samples

D. F. Paling. *Brit. Rayon & Silk J. 30:* 58-61 (January, 1954).

Analysis of two-bar warp knitted fabrics made with full-set threading in both guide bars, but with two or more different types or colors of yarn.

Effect of laundering, perspiration and light on fabrics

L. V. Tolani, H. V. K. Udupa and P. C. Mehta (Ahmedabad Textile Industry's Research Association). *J. Sci. and Ind. Research 12:* 631-639 (December, 1953).

The effect of laundering, perspiration and exposure to light on the life of cotton fabrics has been studied by measuring the changes in cuprammonium fluidity and tensile strength of the fabrics, and the degree of polymerization of the cellulose in the treated and untreated fabrics. Rate constants have also been calculated for the action of perspiration and light on the cotton fabrics. 33 references.

Improvement of luster of cotton. Part 3. Correlation of visual and physical aspects of luster

Lyman Fourt, Ruth M. Howorth and Marjorie B. Rutherford (Harris Research Laboratories, Wash., D. C.). *Textile Research J. 24:* 61-66 (January, 1954).

Luster is not an "absolute" property of the cotton or the yarn, but depends on the sheerness of the fabric, as well as on the weave pattern. The reflectance of individual yarns can be determined, and yarn removed from the fabric has nearly the same luster as the original yarn, if the weaving crimp is removed. The measurement of contrast ratio in yarns correlates with the average of numerous judgments by observers. For fabrics, the ability of the eye to see sparkle or high lights, and to find the angle of maximum reflection, gives visual judgment some features not possessed by the more simple types of physical measurement, although even with fabrics there is a large degree of correlation. 5 references.

Improvement of luster of cotton. Part 4. Effect of weaving pattern on luster in a series of bleached cotton fabrics

Lyman Fourt and Marjorie B. Rutherford (Harris Research Laboratories, Wash., D. C.). *Textile Research J. 24:* 67-72 (January, 1954).

One of the means of increasing luster is variation of weaving pattern or construction. The increase in luster in going from plain weave to a 4/1 float is considerable; a 4/1 float is significantly higher in luster than a 3/1 float, all at constant texture, with the same yarns. Sheerness obtained either by finer yarns or decreased texture also increases luster. However, if cover is kept constant by using more of the finer yarns, the two tendencies oppose each other, reducing the change of luster.

Light spots in rayon fabrics and their causes

H. Reumuth. *Reyon, Zellwolle u. Chemiefasern 31, No. 8:* 419-422 (1953); *in German.* Through *Brit. Cotton Ind. Research Assoc. 33:* 826 (December 31, 1953).

Rayon fabrics, especially cuprammonium rayon materials, are very sensitive to wet treatment. Damages caused by abrasion occur frequently and are more conspicuous in dark material. Tests were made on a piece of cellulose acetate rayon fabric. The photographs in this article have been obtained with a specially designed microscope. They show a degree of destruction of filaments that could not be masked by after-treatment. The conclusions drawn from the laboratory tests agreed with the findings of the manufacturer. The damage was due to abrasion and stretching of the fabric during processing in a semi-damp state.

A STUDY OF SOME FACTORS AFFECTING THE TEAR AND WATER RESISTANCE OF LIGHTWEIGHT CLOTHING AND TENTAGE FABRICS. William E. O'Brien and Louis I. Weiner. Office of the Quartermaster General. Research and Development Division. 1953. 21p. Available from Office of Technical Services, Washington 25, D. C. $.75. PB 111 187. Textile series report no. 81.

Strength and water resistance data are presented for a series of lightweight cotton fabrics varying in weave (wind-resistant twill and sateen), filling yarn type (60/2 combed and 30/1 carded), filling cover factor (15 and maximum), and finish (mercerized and unmercerized, both water repellent treated). The results indicate

that the sateen has better tear strength than the wind-resistant twill but poorer water resistance characteristics. The tighter weaves are less penetrable but more easily torn. The fabrics made of combed filling yarns are better than those made of carded filling yarns in both tear strength and water resistance. Mercerization improves the tear strength but lowers the water resistance, especially for the sateen weaves. Fire resistant treated sateen is shown by the data to have approximately twice the filling tear resistance of fire resistant treated twill, with a somewhat lower, but still satisfactory, hydrostatic resistance. 8 references.

Tear strength of resin-treated textiles

Neal Truslow (Amer. Assoc. Textile Chemists and Colorists. Piedmont Section.) *Am. Dyestuff Reptr. 43:* P41-P45 (January 18, 1954).

One cotton fabric and two rayon fabrics were treated with various amounts of urea-formaldehyde resin and softener. These fabrics were then tested for tensile and tear strengths using a wide variety of methods, some of which have not been previously reported. The results indicate that some of the tear tests are a more accurate and sensitive index of quality than the tests that are more commonly used in the industry. Data shows the effect on strength of varying amounts of resin. The use of softeners is shown to improve tear strength. 33 references.

Instruments and Instrumentation G 2

Absorptiometric colorimetry in the textile laboratory

C. H. Giles and I. S. Shaw. *J. Soc. Dyers Colourists 69:* 481-491 (December, 1953).

This is a description of the principal uses of absorptiometers and colorimeters in a textile laboratory, including their employment for the determination of the concentrations of dyes in solution and of dyes and certain auxiliary products on the fiber, the amounts of metals present on the fiber, and the pH values of aqueous liquids. Tabulated descriptive details of current British instruments are included, and recent developments in the understanding of the relative accuracy attainable in absorptiometric analysis, and its improvement, are discussed. The paper is largely a review, but a little new investigational work has been included where necessary to supplement the published information. 32 references.

Improved device for use with Pressley tester

Lyle E. Hessler. *Textile Ind. 118:* 181 (February, 1954).

An improved variable torque vise for the Pressley tester is pictured and diagramed.

Measurement and control of moisture in fibres, yarns and fabrics

Textile Mfr. 80: 7-8 (January, 1954).

Brief details are given of a range of hygrometers and psychrometer control units now being manufactured and marketed in Great Britain.

Some fundamental questions concerning the static electrification of textile yarns. Part 2

V. E. Gonsalves and B. J. van Dongeren (Research Laboratory, A. K. U., Arnhem, Holland). *Textile Research J. 24:* 1-12 (January, 1954).

The valve voltmeter with electrometertriode developed by the A. K. U. is described, followed by a description of the method and apparatus for measuring the static electrification of yarns. 7 references.

TEXTILE MILLS H

Case history reports

Textile Ind. 118: 101-144 (February, 1954).

These 71 case history reports tell how textile mills are putting modern equipment to work on a profitable basis by saving labor, simplifying jobs, reducing waste, improving quality, and increasing production.

Economy of rationalized power-heat coupling in the textile industry

H. Kittel. *Melliand Textilber. (English ed.) 34, No. 2:* 168-174 (1953).

Emphasis is placed on combining the production of power and heat. Under this system the power contained in the steam in the form of pressure is first exploited in a back-pressure type steam engine to generate electric power and then the heat remaining in the exhaust steam is used for heating.

Get cost data from these steam-plant tests

Sam Boyer (Wisteria Hosiery Mills, Inc.). *Textile World 104:* 96-97 (January, 1954).

Small textile steam plants cannot afford the elaborate recording instruments used in large steam plants. Less-expensive tests can be made to calculate the average horsepower delivered by a boiler and the average cost per 1,000 lbs. of steam. The results show whether boilers are in good shape or not and what should be concentrated on to improve efficiency.

The iron treatment of textile waste waters

M. Kehren and H. Denks. *Z. ges. Textil-Ind. 55:* 1274-1282 (November 5, 1953); *in English.*

The treatment of dyestuff waste waters with ferric chloride is discussed and the results of a series of experiments are given.

Machine interference; a solution of some workload problems arising when an operative has charge of more than one machine

F. Benson, J. G. Miller and M. W. H. Townsend (Wool Industries Research Association). *J. Textile Inst. 44:* T619-T644 (December, 1953).

An account is given of the effects of machine interference, its importance, and a full description of convenient methods for calculating production rates and work loads which take the effect of interference into account. The first part of the paper reviews the fundamental principles which are used in applying the theory; the second part consists of three sections in which examples are given of the application of the method to winding, spinning and weaving.

New modern smoke-indicating device in textile mills

Rudolf Walz. *Textil-Praxis (English ed.) No. 4:* 189-191 (November, 1953).

The smoke-indicating instrument "Florian" consists of two parts: (1) the smoke-indicators and (2) a central device. Each smoke indicator can be adjusted to a specified sensitivity by a special set-screw and by the indicating instrument on the central device. Set at highest sensitivity, a smoked cigarette would be indicated by the central station. The period of time between a beginning fire and alarm is but a few seconds. A smoldering fire can be detected early and unnecessary water damage from a sprinkler system avoided.

New variable speed drive

Stahlkontor Weser G.m.b.H., Germany. *Textil-Praxis (English ed.) No. 4:* 192 (November, 1953).

A new type belt drive is described.

Non-metallic gears and bearings

A. E. Williams. *Textile Merc. 130:* 111-115 (January 15, 1954).

Advantages include noise reduction, long wearing properties, little or no need for lubrication, and ease of manufacture. Design and lubrication are discussed.

Possibilities for systematic control in wool yarn production

G. H. Thorndike and A. Brearley. *J. Textile Inst. 44:* P794-P805 (December, 1953).

Some stages of woolen manufacture where systematic testing may prove beneficial are indicated. Suggestions are given for installing quality-control schemes in mills, and graphical methods of presenting test data are presented. 14 references.

Production control at Avondale is based on mill-order sets

Thomas B. Winston. *Textile World 104:* 98-101, 196-202 (January, 1954).

Mill orders are individually controlled from warping through shipping by a production-control department in each mill. The production-control department keeps tabs on a mill order with tickets, tags, yardage records, and expediters.

Recovery of wool wax from wool scour liquors

L. F. Evans and W. E. Ewers. *Australian J. Appl. Sci. 4:* 552-580 (December, 1953).

The liquors are aerated in flotation cells, the froth formed being recirculated through the impellers of the cells in order to make the wax in the froth more granular and the froth less bulky. The froth is then washed by passing it in counterflow with wash water through two more flotation cells. The washed concentrate contains about 10 per cent wax, which on draining rapidly increases to 20 per cent. This concentrate is dispersed in an alkaline medium to give a concentrated emulsion from which good quality wool wax is obtained by centrifuging. 10 references.

Select transmission belts to make them last

Newel Perry. *Textile World 104:* 122-123, 212-214 (February, 1954).

Charts are given for selecting belts for size of pulleys, angle of pulley contact, ply number and thickness, and flexibility and strength.

Textile World 1954 annual review and forecast section

Textile World 104: 81-96, 222-229 (February, 1954).

Mill production, purchases, machinery developments, mill processes, dyeing and finishing,

research, engineering, personnel, the Washington outlook, and the world textile picture are covered.

CHEMISTRY AND PHYSICS OF TEXTILE MATERIALS I

Absorption of divalent bases on nylon fibers

Frederick T. Wall and Patricia M. Saxton (Univ. of Illinois). *J. Phys. Chem. 58:* 86-90 (January, 1954).

The absorption of strontium hydroxide on nylon fibers is experimentally investigated. 11 references.

Action of ninhydrin on keratin

R. Cockburn, L. G. Jagger and J. B. Speakman. *Nature 172:* 75 (July 11, 1953). Through *Hosiery Abstr. 3:* 40 (October, 1953).

The remarkable cross-linking action of ninhydrin on protein fibers is demonstrated. Besides strengthening intact fibers, ninhydrin is even more effective with damaged fibers. It is expected that related compounds, which give uncolored derivatives, will find a use in processes for reinforcing protein synthetic fibers as well as natural fibers.

Adsorption in capillaries

C. Pierce and R. N. Smith. *J. Phys. Chem. 57:* 64-68 (1953). Through *Chem. Abstracts 47:* 5211 (June 10, 1953).

A review of the properties of porous solids. The methods and limitations of pore-size calculations are discussed.

Aliphatic woolwax alcohols: a review

H. W. Knol. *J. Am. Oil Chemists Soc. 31:* 59-62 (February, 1954).

A critical examination of the available literature on the aliphatic woolwax alcohols. 41 references.

Chemical engineering: unit operations

Ind. Eng. Chem. 46: 57-140 (January, 1954).

This is the ninth annual unit operations review to appear in the January issue of *Industrial and Engineering Chemistry.* Absorption and humidification, adsorption, centrifugation, crystallization, high temperature distillation, drying, evaporation, liquid extraction, filtration, flotation, fluid dynamics, ion exchange, leaching, materials handling, mixing and size reduction are covered. Extensive bibliographies are presented with each topic.

CHROMATOGRAPHY: ITS USE IN THE QUANTITATIVE ANALYSIS OF DETERGENT AND SOAP INGREDIENTS. An abstract bibliography. Florence H. Cozzi. Phila., Technical Library, Qpartermaster Research and Development Laboratories, 1953. 24p. Bibliographic series no. 29. Available from Office of Technical Services, Washington 25, D. C. $.75. PB 111 210.

This literature search was undertaken to determine the extent to which partition and paper chromatography have been used in the quantitative analysis of synthetic organic detergents and soap. All substances used as components of these products, including to some extent disinfectants and masking agents, have been included. A few general articles on the chromatographic method are listed for background data on techniques. Literature consulted covers the period 1942 to June 1953. 83 references, with abstracts.

Chromium

Ciba Rev. No. 101: 3618-3650 (December, 1953).

Chromium is indispensable to a large number of operations in the textile and leather industries and is incorporated into many dyes used for wool, synthetic fibers and leather. Its history and uses are reviewed. 31 references.

Developments in man-made fibre production and processing technology, 1953. Part 1. The polymer in relation to fibre properties

Brit. Rayon & Silk J. 30: 52-56 (January, 1954).

This review of chemistry in textiles will be in four parts: raw materials (polymeric substances from which fibers are spun), fiber production, dyeing, and finishing. 40 references, mainly to patents.

Electrical potential of nylon fibers in aqueous media

Frederick T. Wall and Patricia M. Saxton (Univ. of Illinois). *J. Phys. Chem. 58:* 83-86 (January, 1954).

The electrical potential of a nylon fiber interacting with solutions of bases is calculated from theoretical considerations and previously obtained experimental data. It is shown that the fiber potential, which is in the neighborhood of -0.3 volt, is relatively insensitive to temperature changes. The number of end groups on the fiber that must be charged to produce this potential is shown to be negligibly small compared to the number of end groups interacting with the basic

solutions. This calculation verifies the assumption, usually made for the theoretical development of the absorption equations, that equivalent numbers of cations and anions are absorbed by the fiber. 12 references.

Fibre-forming polymers from hydrazine. Part 3

R. W. Moncrieff. *Textile Mfr. 80:* 33-39 (January, 1954).

The chemical activity of the polyaminotriazoles, particularly in relation to dye affinity. 12 patent references.

Fine structure of cellulose microfibrils

A. Frey-Wyssling (Swiss Federal Institute of Technology). *Science 119:* 80-82 (January 15, 1954).

The structure of microfibrils detected in native cellulose is discussed and diagrammed. 15 references.

Irradiation of polymers by high-energy electrons

E. J. Lawton, A. M. Bueche and J. S. Balwit. *Nature 172:* 76-77 (July 11, 1953). Through *Hosiery Abstr. 3:* 40 (October, 1953).

Experiments on the irradiation of polymers by high-energy electrons revealed that some became cross-linked and others degraded. These are listed. The properties of irradiated samples of polyethylene, nylon and polydimethylsiloxane were investigated in detail. These showed that the amount of cross-linking appeared proportional to the amount of irradiation, the physical properties (such as tensile strength and elongation) changed, and the solubility was affected. Efficiencies for cross-linking varied widely from polymer to polymer.

Micro-organic attack on textiles and leather

M. Nopitsch (Clothing Physiological Research Institute, Schloss Hohenstein, Germany). *Ciba Rev. No. 100:* 3578-3610 (October, 1953).

The discovery of the microbes; microbial deterioration of wool and other animal fibers; microbial damage to vegetable fibers; decay of fishing nets through microbiological action; microorganic attack on leather; identification of microbial damage, and culture methods; and preventive treatments for textiles and leather. Bibliography.

Molecular weight of alpha-cellulose from jute and allied long fibers

H. Chatterjee, K. B. Pal, and P. B. Sarkar (Indian Central Jute Committee). *Textile Research J. 24:* 43-52 (January, 1954).

Four methods commonly employed for the estimation of cellulose, with special reference to jute, have been critically studied by means of viscosity measurements (and hence molecular weight) of the alpha-cellulose obtained with each in cuprammonium hydroxide. The cellulose molecule is degraded to different extents by all the methods of delignification; the Cross and Bevan method, however, appears to give the least degraded product. Pure cellulose is much more degraded than lignocelluloses. Generally, the use of caustic soda higher in concentration than 9.3% to extract alpha-cellulose or mechanical action of disintegration of the material brings about further degradation. The molecular weights of alpha-cellulose from different fibers have been determined. From the results thus obtained, a formula is suggested to calculate the intrinsic viscosity, and hence molecular weight, from the relative viscosity of a cellulose solution at a single concentration. 53 references.

Nonabsorptive light losses in microspectrophotometry of biologic material; an experimental study on cellulose fibres esterified with p-phenylazobenzoyl chloride

Paul W. Lange (Swedish Forest Products Research Laboratory, Stockholm, Sweden). *Svensk Papperstidn. 56:* 807-817 (November 15, 1953); *in English.*

A short review on the problem of nonabsorptive light losses in quantitative microspectrophotometry of biologic material is given. Possible methods for overcoming this problem are discussed. Four experiments on cellulose fibers esterified with p-phenylazobenzoyl chloride are described in which it is shown that swelling of the esterified fiber in pyridine reduces the nonabsorptive light losses down to about 5 per cent. In an appendix, methods are given for preparing cross sections of short fibers and for measuring their thickness. 11 references.

Odors in textiles

C. H. Fischer-Bobsien. *Z. ges. Textil-Ind. 55:* 1287-1297 (November 5, 1953); *in English.*

Various aspects of textile odors and their control are discussed. 21 references.

Quality control in textile processing. Part 2

A. Webster. *Textile Mfr. 80:* 19-23 (January, 1954).

Quality considerations in the processing of cotton linters for use in making cellulose acetate rayon are discussed. The use of wood pulp cellulose is also described.

A rapid macro- and micromethod for the determination of the viscosity of cellulose

P. H. Teunissen. *Enka Breda Rayon Rev. (English ed.) No. 6:* 23-31 (November, 1953).

A rapid method for determining the viscosity of cellulose is described. The method is applicable to any form in which the cellulose occurs.

Relative reactivity of the hydroxyl groups of cellulose

T. E. Timell. *Svensk Papperstidn. 56:* 483-490 (July 15, 1953); *in English.* Through *J. Soc. Dyers Colourists 69:* 474 (November, 1953).

From a review of the literature it is concluded that the 6-hydroxyl group is generally the most reactive, though in some cases conditions favor the preferential conversion of the 2-hydroxyl group; and the 3-hydroxyl has always been found least reactive. A series of ten different low-substituted carboxymethyl celluloses and the water-soluble fraction of each were analyzed in a study of the relative reactivity of the primary and secondary OH groups during carboxy-methylation. The primary OH groups were found to be approximately twice as reactive as the average of each of the secondaries. Over oxidation occurs in periodate oxidation, as compared with the periodate-formaldehyde method, probably accounting for the low content of the secondary OH groups found by previous investigators. As the OH groups of cellulose apparently behave differently towards different reagents and under different external conditions, general statements regarding their relative reactivities accordingly seem uncertain. 51 references.

SYMPOSIUM ON MACROMOLECULES. International Union of Pure and Applied Chemistry. Stockholm-Uppsala, July 29-August 7, 1953. N. Y., Interscience Publishers, 1954. 638 p.

The complete papers of this symposium are published as volume 12, January 1954, of the *Journal of Polymer Science.*

Uneven drying of wet cotton fabric

B. C. M. Dorset. *Textile Mfr. 79:* 647-649 (December, 1953).

A general survey of investigations into the brown line effect and possible explanations for the chemical changes which take place at the wet-dry boundaries. Many references to the literature.

Use of detergents in the wool textile industry

J. L. Stoves. *Fibres 15:* 19-21 (January, 1954).

Qualitative and quantitative analysis of anionic, cationic and non-ionic detergents. 4 references.

Use of silicones in the textile industry. Part 1

D. C. R. Miller. *Can. Textile J. 70:* 72-75 (December 18, 1953).

Silicone high-temperature lubricants, antifoam agents, electrical insulating resins and varnishes, and masonry water-repellents.

TEXTILE EDUCATION AND RESEARCH J

C & EN annual review of developments in the chemical and chemical process industries

Chem. Eng. News 32: 12-47 (January 4, 1954).

1953 textile technology developments are reviewed by Milton Harris and John Krasny on pages 38-40. Other chemical areas reviewed are: finance, foreign trade, foods and nutrition, petroleum, rubber, plastics, fertilizers, pesticides, protective coatings, soaps and syndets, pulp and paper, metal industries, and medicinal chemistry.

Let's take it up with TRD

Robert E. Ellsworth. *Modern Textiles Mag. 35:* 35, 64, 66 (January, 1954).

The Textile Research Department of American Viscose Corporation, Marcus Hook, Pa., and its director for 15 years, Edgar S. Kennedy.

Plastics: the year of 1953 in review

Modern Plastics 31: 117-133, 189-192, 195-201 (January, 1954).

A review of progress in plastics during 1953. 541 references.

A textile industry for the West

Anita Kastens. *Chem. Eng. News 31:* 3132-3138 (August 3, 1953).

A discussion of the economic feasibility and practicality of a textile industry on the West Coast. Economic "need", raw materials, related markets, financing, labor supply and wages are considered.

Textile research achievements in 1953

J. B. Goldberg. *Textile Bull. 80:* 51-57 (January, 1954); *Knitter 18:* 37-41 (January, 1954); *Textile Age 18:* 22-25 (February, 1954); *Am. Textile Reptr. 68:* 25-34, 51-52 (January 14, 1954).

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